Geel 2000 Language Schools

Science Department



Prep. (2)



First term

(2024-2025)

Name:………………………………….

Class: …………………………………….

Lesson one

Attempts of elements classification

By increasing the number of discovered elements, scientists classified them according to their properties in order to :

-facilitate their study.

-find a relationship between elements.

The most important attempts are:

Mendeleev's Periodic table.

Moseley's Periodic table.

Modern periodic table.

Mendeleev's table:

- **Mendeleev arranged element according to atomic weight.**
- Mendeleev prepared 67 cards each element represented an element.
- He arranged element of similar properties in vertical columns which were Known later as groups.
- Atomic weight from left to right in horizontal row(periods)

Advantage of Mendeleev's table:

-He left gaps in his table to predict a new elements.

-He corrected the atomic weight of some elements .

Disadvantage of Mendeleev ‘s table :

- He had to make disturbance in the ascending order of atomic weight of some elements.
- He had to deal with the isotopes of one element as different elements.

Isotopes :they are element have different atomic weight and same atomic number.

Moseley ‘s periodic table.

The English scientist Moseley discovered after x- rays

Element are related to their atomic number.

-He arranged element in an ascending to their atomic number.

-He added zero group which includes inert to the table.

-He specified a place below the table for lanthanides and actinides elements .

NOTES:

The newZealand scientist Rutherford discovered the nucleus of the atom contains positively charged protons.

Modern periodic table

The Danish scientist Bohr had discovered the main energy levels of the atom and their number reaches 7 in the heaviest atoms.

-elements are classified in the modern periodic table in an ascending order to

***their atomic numbers.**

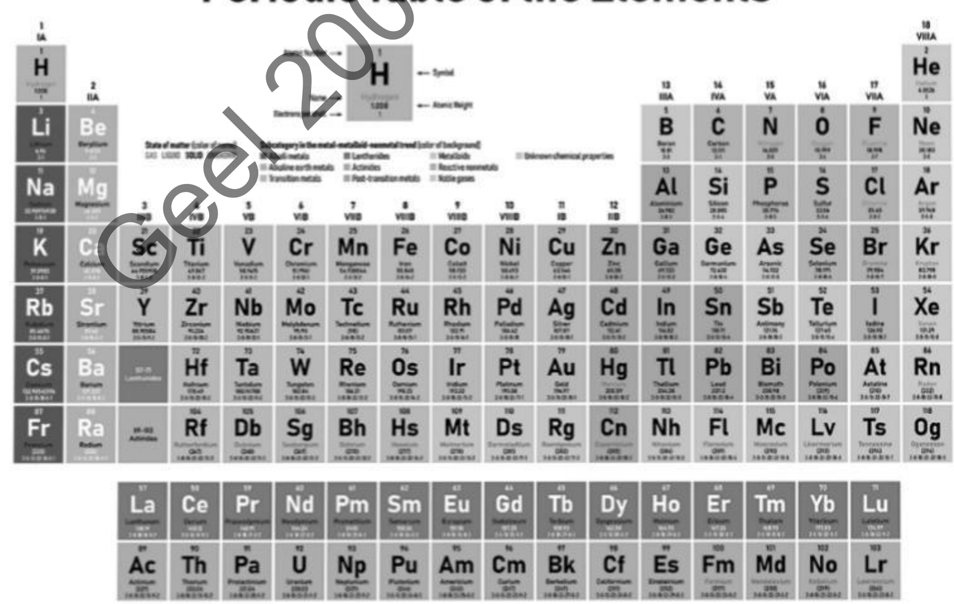
***The way of filling the energy sublevels with electron.**

Description of modern periodic

- The no. of known elements in the modern periodic table till now is 118 elements,92 elements are available in earth's crust.

-The modern periodic table consists of :

-7 horizontal periods and 18 verticalgroups(18 columns).



S-block elements	P-block elements	d-block elements	f- block elements
Located on the left side.	Located on right side.	Located on the middle	Located below the periodic table
They are arranged ed in two groups 1A ,2A	They are located on right side in six groups 3A,4A,5A,6A,7A and zero group.	Arranged in 8 groups 3B,4B,5B6B,7B 8 1B,2B	They are located below the periodic table
		They are known as transition elements.	The include lanthanides and actinides.
		They appear to start from period 4	

How to locate the position of an element:

The element period number = no of energy levels occupied by electron.

The element group number = no of electron in outermost energy level.

Example : the electronic configuration of neon Ne_{10}



2 8 **Located in period 2 group 0**

Elements of the same group	Element of the same period
They are similar in the no of electrons in the outermost energy level they are similar in their chemical properties.	differ
They are different in the number of energy levels occupied by electron.	similar

Calculate the atomic number of the following elements:

1-An element is located in 1st period and group 1A

....

Locate the position: 1-Neon Ne_{10} 2- chlorine Cl17

Q (2): Complete :

1- Moseley put .... and .... series below the periodic table.
2- By increasing the atomic number the value of mass number will ....
3- The modern periodic table consists of.........................horizontal periods and .... vertical groups.
The two scientists .... and......................... made modifications in

- **Q (1): Choose :**

1 The number of known elements is ....

(216 - 116 - 316 - 16)

2- The number of negative electrons in the atom in its normal state equals.......................... .

Number of protons

Twice the number of protons

Number of neutrons

Half the number of neutrons

3- The atomic number of the element equal ....

The sum of the neutrons number in the nucleus

Sum of the number of electrons rotating around the nucleus

The number of protons inside the nucleus

Both the last 2 answers

Lesson 2

Graduation of the properties of elements in the modern periodic table

The graduation of some properties of the elements in periods and groups (A)

Such as:

1-Atomic size

2-Electronegativity.

3-Metallic and non-metallic properties.

1-Atomic size:

-The atomic size is determined by known the atomic radius of the atom and its measuring unit is picometre (Pm).

Graduation of atomic size of elements in the periodic table:

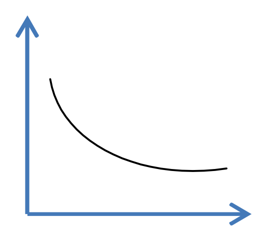
Atomic size increase

Atomic size decrease.

In periods: by increasing the atomic number(from left to right),the atomic size decreases

Give reason: due to the increase in the attraction force between the positive nucleus and outermost electrons.

The atomic size of the elements of the same period is inversely proportional to the atomic number.



In groups: by increasing the atomic number (from up to down) the atomic size increase.

Due to the increase in the number of energy levels occupied by electrons.

The atomic size of elements of the same group is directly proportional to atomic number.

The largest atom of element in size is cesium the smallest one is fluorine.

2- electronegativity

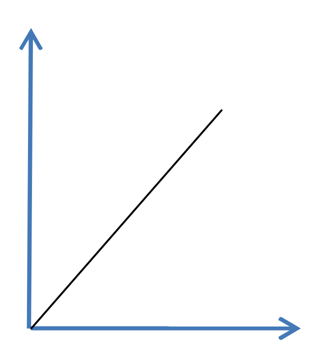
It is the ability of the atom in covalent molecule to attract the electron of the chemical bond towards itself

decrease

Electronegativity increase.

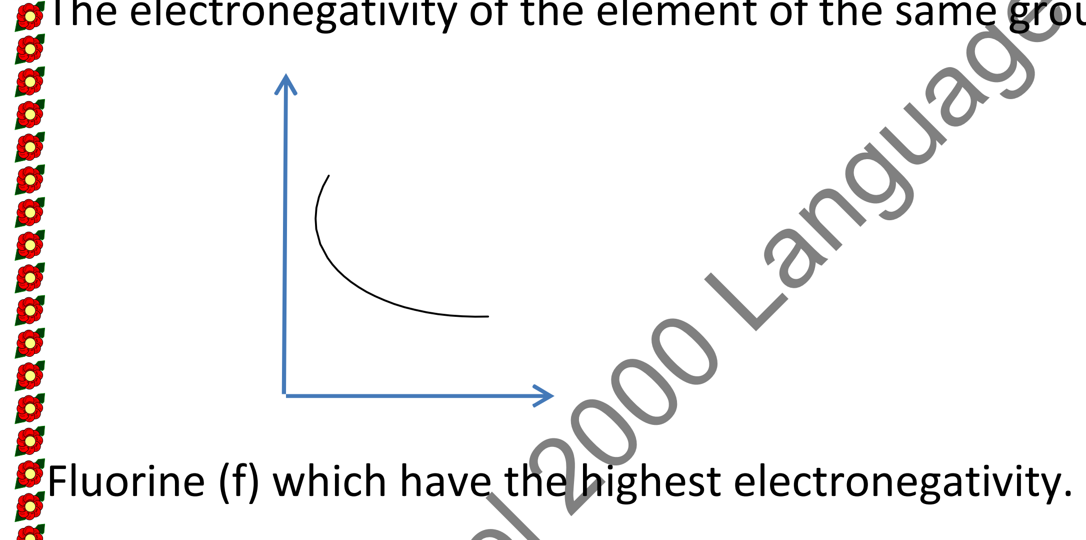
In periods :

By increasing the atomic number (from left to right) the electronegativity of the element of the same period is directly prop. To atomic number.



In groups: by increasing the atomic number the electronegativity decrease

The electronegativity of the element of the same group is inversely prop.



Fluorine (f) which have the highest electronegativity.

Note:E N between two element more than 1.7 (ionic bond)

,less than 1.7 covalent bond.

Polar compound:

They are covalent compound in which the difference in electronegativity between their element is relatively high.

Example:

Water molecule - ammonia molecule

Water molecule:

- The ability of an oxygen atom to attract the two electron of covalent bond towards is greater than the ability of hydrogen atom.

Water is consider one of the polar covalent.

Bec the difference in electronegativity between its elements is relatively high.

Ammonia molecule :

It consists of combination of one nitrogen atom with three hydrogen atoms.

The ability of a nitrogen atom to attract the two electrons of the covalent bond towards it, is greater than that of a hydrogen.

Ammonia is considered one of the polar covalent compound .

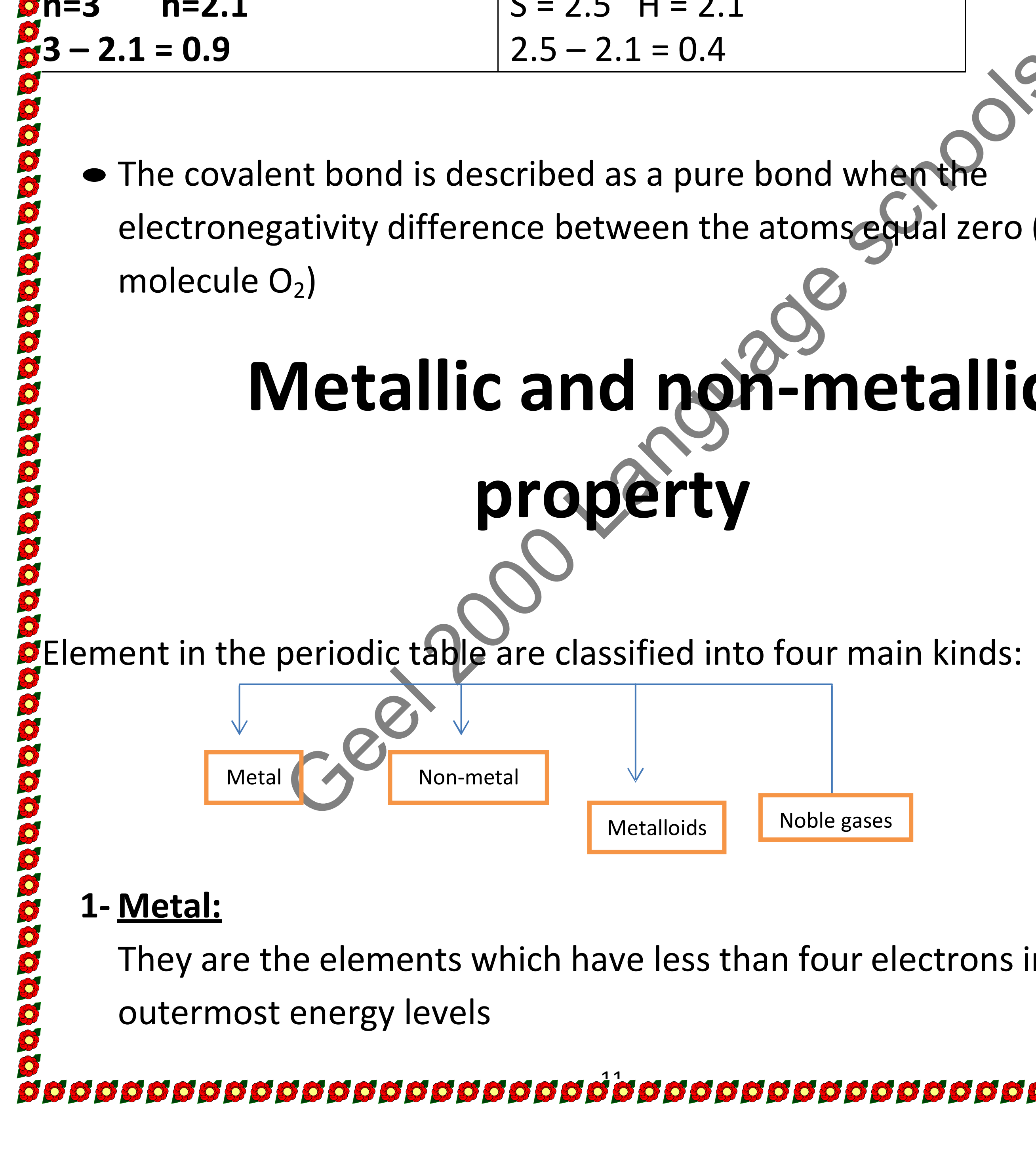
Bec. the difference in electronegativity between its elements is relatively high.

Polar compound	Non-polar compound
it is a covalent compound the electronegativity between its elements is relatively high	it is a covalent compound the electronegativity between its elements is relatively low.
water molecule H_2O **o= 3.5 H= 2.1** **3.5 – 2.1 = 1.4** **Ammonia molecule** **n=3 h=2.1** **3 – 2.1 = 0.9**	Methane gas molecule CH_4 c = 2.5 H = 2.1 2.5 – 2.1 = 0.4 Hydrogen sulphide H_2S S = 2.5 H = 2.1 2.5 – 2.1 = 0.4

- The covalent bond is described as a pure bond when the electronegativity difference between the atoms equal zero (oxygen molecule O_2)

Metallic and non-metallic property

Element in the periodic table are classified into four main kinds:



1- <u>Metal:</u>

They are the elements which have less than four electrons in their outermost energy levels

2-Nonmetal:

They are the elements which have more than four elements.

Metallic elements tend to gain their outermost electron and change into negative ions to reach to nearest noble gas.

Electrons in their outermostenergy levels.

3-Metalloids :(semi metal)

They are the elements which have the properties of both metal and non metal.

Graduation of metallic and non metallic property in the periodic table.

- In periods :
  Starts with strong metal by increasing the atomic number:
  The metallic property decrease till we reach metalloid.
  Then the nonmetallic property appears and increase till reach the strongest nonmetal and end in inert gas.

Metallic property decrease.

In groups:

A-In metallic groups:

The metallic property increase gradually as we go from top to bottom as group(1A)Bec the atomic size increas

Metallic property increase

Cs is the most metallic

Li is the least metallic

B- In non metallic

Non metallic property decrease.

The nonmetallic property decrease gradually

as we go from top to bottom in group(7

Bec the decrease in electronegativity.

The elements of this group are arranged descending according to the graduation of nonmetallic property.

F the strongest nonmetal.

I is the least nonmetal element.

- The atomic size decrease. *The electronegativity increase.
- The metallic property decrease * The non metallic property increase.

*The atomic size increase.

*The metallic property increase.

*The electronegativity decrease.

Chemical properties of metal:

1- Reaction of metals with dilute acids:

A-Some active metals such as Mg,Zn react with dilute acids giving salt of acid and hydrogen gas is evolved.

$Mg + 2HCl \longrightarrow MgCl_2 + H_2$

B-Inactive metals such as copper don't react with dilute acid.

$Cu + HCl \longrightarrow$ no reaction .

2-Reaction of metals with oxygen:

Some metal react with oxygen giving metal oxides which called basic oxides.

$2Mg + O_2 \longrightarrow 2MgO$

$MgO + H_2O \longrightarrow Mg(OH)_2$

3-Reaction of metal with water

<u>Chemical activity series:</u>

It is a series in which metals are arranged in decending order according to their activity.

Metal	**Reaction with water**
Potassium Sodium	React quickly with water and hydrogen gas evolves burn with pop sound.
Calcium magnesium	They react very slowly with cold water.
Zinc iron	They react with hot water at high temp.
Copper silver	They don't react with water.

metal	nonmetal
React with HCl $Mg + 2HCl \longrightarrow MgCl_2 + H_2$	No reaction
React with oxygen $2Mg + O_2 \longrightarrow 2MgO$ $MgO + H_2O \longrightarrow Mg(OH)_2$	$C + O_2 \longrightarrow Co_2$ $CO_2 + H_2O \longrightarrow H_2CO_3$
Basic oxides: Metal oxide some of them dissolve in water forming alkaline solution.	**Acidic oxides:** Nonmetal oxide dissolve in water forming acidic solution.

- Aluminum oxide are known as amphoteric oxide

  They can react with acid and base.

Exercises

Q (1) : Explain with chemical reaction (if found):

1- The behavior of iron, silver potassium in water.
2- Reaction between carbon (C) and hydrochloric acid HCl.
3- Reaction between (Mg) magnesium and HCl.
4- Reaction between (Mg) magnesium and oxygen (O_2).
5- Reaction between water (H_2O) and carbon dioxide (CO_2)

Q(2) : Write the scientific term :

1- The ability of the atom in the covalent molecule to attract the electrons towards itself. (……………………………………….)
2- A kind of elements in which their valency shell contain less than 4 electrons. (…………………………………….)
3- A kind of oxides that react as acidic or basic oxides according to the reaction conditions. (…………………………………………….)
4- A kind of elements which has more than 4 electrons in its outermost shell(……………………………………………)

Lesson three:

Main groups in the modern periodic table

Alkali metal (group(1A))	Halogen (group(7A))
Located on left side of modern periodic table.(first group)	Located on right side of modern periodic table before inert gas in block p (7A)
Li_3 Na_{11} K_{19} Rb_{37} Cs_{55} Fr_{87}	F_9 Cl_{17} Br_{35} I_{53} At_{85}
They are good conductor of heat and electricity.	They are mono-valent elements because their outer most energy have 7 electron.
Most of them have low density. Li,Na,K float on water as their density less than water	They tend to gain one electron during chemical reaction and convert into negative ion $M \longrightarrow M^-$

Rb,Cs elements sink in water their densities are greater than water.	
They are mono-valent because they have one electron. They tend to lose and fuming positive ion.	They exists in the form of diatomic molecules (formed of two atom) Their physical states is graduated from gas to liquid to solid
They are active element they are kept under surface of kerosene Their chemical activity increase as atomic size increase Cs is most active metal. They are named alkali metal as their elements react with water forming alkaline solution.	They are active elements they are found combing with other element Exept At prepared They react with metal forming salt so they are called halogen (forming salts) $2K+Br_2 \rightarrow 2KBr$ Each element replaces the element below it in its salt solution. $Cl_{2+}2KBr \rightarrow 2KCl_2+Br_2$

$Cl_2+2KI \rightarrow$

$2NaCl+Br_2$

$Br_2+2KI \rightarrow 2KBr+I_2$

Properties of element and their uses:

element	Its uses
Na	It is used in liquid state in transferring heat from inside the nuclear reactor to outside(heat used in generate electricity)
Cobalt	Its is used in food preservation Bec. It emits gamma rays which prevent the reproduction of microbes.
silicon	Used in manufacture of electronic device(bec it is semi conductor)
Liquefied nitrogen	It is used in preservation of cornea of eye due to the decrease in its boiling point(-196 C)

Exercises

Q (1): Give reasons :

1- Elements of group (1A) is called alkali metals.
2- Silicon slides used in the manufacturing of computers.
3- Coal is used in getting rid of the odour of the refrigerator.
4- Liquefied nitrogen is used in the preservation of eye cornea.
5 - Sodium and potassium are kept under kerosene or paraffin.

- **Q (2) : Show by balanced equations :**

1- The reaction between sodium (Na) and water(H2O).
2- The reaction between chlorine (Cl) and potassium bromide (KBr).

Q (3) : What is the symbol which represents :

1- The most active metal.

Lesson 4

Water

Sources of water:

Waterareas (river,oceons and seas)

Rains wells springs

THE MAIN FIELD IN CONSUMING WATER INTERNATIONALLY ARE:

1-Agricultural fields

2-Industrail field

3-Personal fields

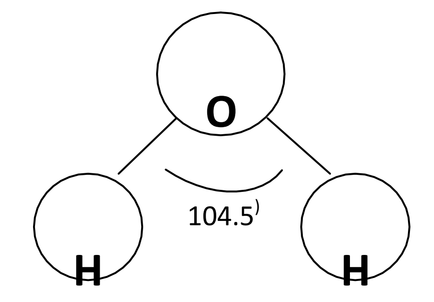
Asia used water in agriculture.

Europe used water in industry.

South America consuming water for personal uses

Structure of water:

Water molecule is formed by combination of one oxygen with two hydrogen by two single covalent bonds the angle between them is 104.5^0



-due to higher electro negativity of oxygen to hydrogen water molecules are linked together by hydrogen bonds.

Hydrogen bond:

It is a weak electrostatic attraction force that arises between the molecules of polar compound.

Properties of water:

A-physical properties

B- chemical properties.

Physical properties:

1-**water exists in three states**:

Water exists in three states which are solid , liquid , gas

2**-water is a good polar solvent:**

It has a great ability to dissolve most ionic compound such as table salt.

Water can also dissolve some covalent compounds such as sugar that can form hydrogen bond with it.

Some covalent compound(oil) can't dissolve they can't form hydrogen bonds with water.

3- rising of water boiling point and its freezing point:

Boiling point of water is less than(100^{o}c) and freezing point is less than (0^{0}c)

This is due to the presence of hydrogen bond between its molecules.

4- water density decrease on freezing:

The density of water in solid state lower density in liquid

When the temperature of water becomes less than 4^{0}c

Water molecules are collected together by hydrogen bond forming ice crystals which have hexagonal shapes.

Ice crystals float on the water surface and this helps in the preservation of the life of aquatic creatures in it.

- **Water has a neutral effect on litmus paper:**

Bec. When it ionzes, it gives equal number of
Positive hydrogen ion which are responsible for the acidic property.
Negative hydroxide ion which are responsible for the basic property.

The idea of work of the Hoffman's voltmeter which is used for the electrolysis of acidified water.

$2H_2O \longrightarrow 2H_2\uparrow + O_2\uparrow$

The volume of hydrogen gas =2 x volume of oxygen gas

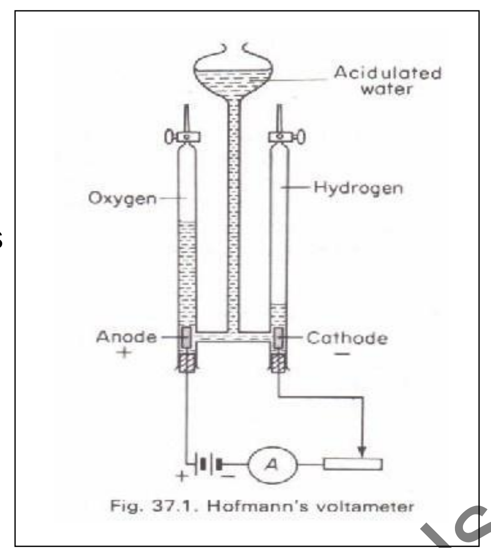


Fig. 37.1. Hofmann's voltameter

During electrolysis of acidified water by Hoffman's voltmeter,oxygen gas evolves at the anode, while hydrogen gas evolves at the cathode.

Bec.oxygen ions are negatively charged so,oxygen gas evolves at the anode, while hydrogen ions are positively charged so hydrogen gas evolves at the cathode.

-Adding few drops of dilute sulphuric acid to water during its electrolysis by Hofmann's voltammeter.

Bec pure water is bad conductor of electricity ,but acidified water conducts electricity.

Water pollution:

It is the addition of any substance to water which causes continuous change in water

Environmental pollutants can be divided



1-Natural 2- artificial

1- **Natural pollutants**:

-volcanic eruption.

-death of living

-lightning accompanying thunder storms.

2-**Artifcial pollutants:**

Burning coal

Types of water pollutions:

Kind of pollution.	Its causes (origin)	Its harms (damage)
1-biological pollution.	Mixing animal and human wastes with water.	The infection by many diseases such as bilharzia,typhoid and hepatitis.
2-Chemical pollution	Discharging factories and sewage in seas.	Eating fish which contain high concentration of **lead** causes the death of brain cells. **Mercury** causes blindness.

		<u>Arsenic</u> increasing the infection rate by liver cancer.
3-thermal pollution	Increasing the temp.(used in cooling the nuclear reactors.	Death of marine creatures due to the separation of dissolved oxygen from water.
2- Radiant pollution	Dumping the atomic wastes in seas. Leakge of radioactive material	Increase in incidence of cancer.

<u>Protection of water from pollution:</u>

1-Preventing or getting rid of sewage, wastes of factories and dead animal in river.

2-Developing the stations of water purification.

3-disinfection of the drinking water tanks in periodical manner.

4-don't store the tap water in empty plastic bottles.

Bec plastic reacts with chlorine gas leading to the increase in the infection rates by cancer.

5-spreading environmental awareness among people to protect water from pollution.

<u>Exercises</u>

<u>Q. (1): Give reasons:</u>

1- Presence of hydrogen bonds between water molecules.
2- Pure water doesn't affect litmus papers.
3- Although sugar is a covalent compound, it dissolves in water.
4- Tap water should not be stored in plastic bottles of mineral water.
5- Water has a high boiling and freezing points.

Unit 2

The atmosphere and protecting planet earth

Lesson1

The atmospheric layer.

Atmospheric envelope of earth:

It is a gaseous envelope rotating with the earth around its axis and it extends about 1000Km above sea level .

Atmospheric pressure:

It is the weight of air column of an atmospheric height on unit area.

Normal atmospheric pressure:

It is the atmospheric pressure at sea level and it equals 1013.25mb.

1 bar = 1000 millibar.

The instruments of measuring the atmospheric pressure:



Aneroid: types of barometers

It is used to determine the possible day weather.



Altimeter: used by pilots to measure the elevation.

Atmospheric pressure maps:

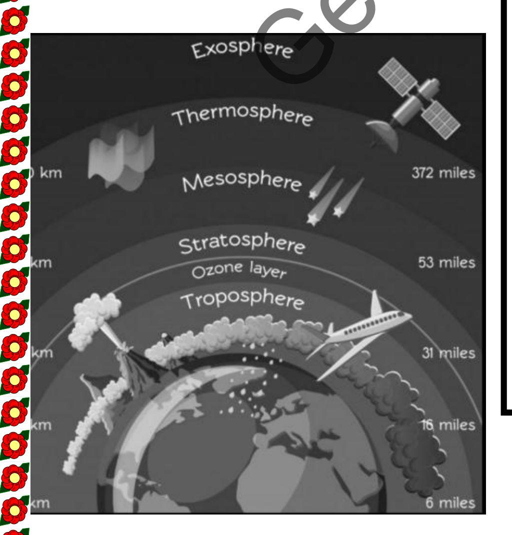
Atmospheric maps:

They are maps in which the point of the same pressure are connected together by curved lines called isobar.

Isobar: it is curved lines that join that points of equal pressure in the atmospheric pressure maps.

Layer of atmospheric envelope

1- Troposphere
2- Stratosphere
3- Mesosphere
4- Thermosphere



There is region between each two successive layer the temp. remains constant.

1-tropopause :region between troposphere and stratosphere.

2-stratopause: region between stratosphere and mesosphere.

3-mesopause : region between mesosphere and thermoshere.

troposphere	stratosphere	mesosphere	thermosphere
First layer it means the disturbed layer all weather changes take place in it.	Second layer it is called the ozonic atmospheric envelope	Third layer of atmospheric envelope The coldest layer.	Fourth layer it called thermal layer bec it is the hottest layer.
Thickness of troposphere is 13 Km	Thickness of this layer is 37 Km	Thickness of this layer is 35 Km.	Thickness of this layer 590Km.
Temp. layerdecrease at rate(6.5^{0}c)it reach to-60^{0}c	Temp. increase until reach (0^{0}c) Due to absorption of u.v.	Temp.decreases at ahigh rate as we go up until it reach -90	Temp increase as we go up until it reach 120 ^{0}c
The atmospheric pressure decrease as we go up until it become 100mb at its top100=0.1bar from the normal.	1mb=0.001bar from the normal.		Contains charged ions
It contain 75% of mass of the atmospheric air all phenomena accur on it.it contains 99% of atmospheric water vapour.	It contain most of ozone gas which is found in atmospheric at height of 20:40km	It contain limited quantities of helium and hydrogen(vacuumed) (highly rarefied)	
Air movement is vertical.	The lower part of such layer doesn'tcontain cloud or weather disturbance and the air movement is horizontal so pilots prefer to fly their planes in this layer.	It protect the planet earth from celestial rocky where they burn as a result of their friction with air molecules forming meteors.	

Note:

We can calculate temperature at any height from sea level in troposphere layer using the following:

The temperature at certian height = temperature at sea level - the decrease in temperature

The decrease in temperature = height (Km) x 6.5 C

Ionosphere layer:

It is a layer that contains charged on and it has an important role in wireless communications.

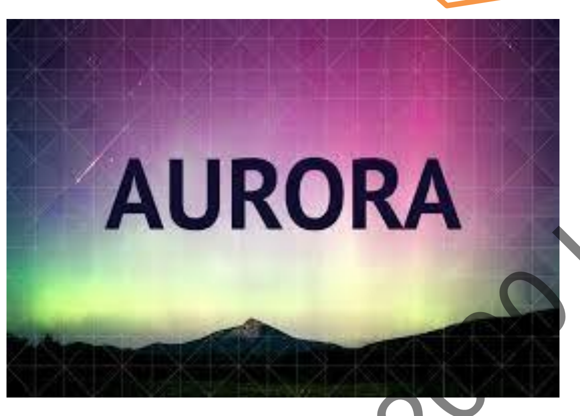
Van-Allen belts:

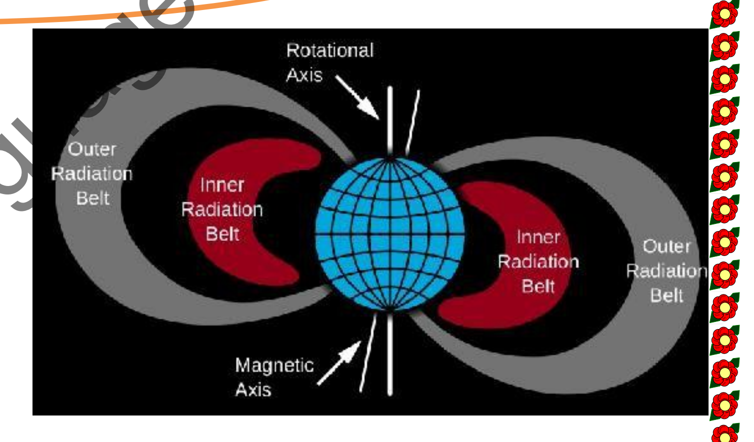
They are two magnetic belts surrounding ionosphere and play an important role in scattering harmful charged cosmic radiations.

Aurora phenomenon:

It appears as bright colourful light curtain seen from the both poles

Importance: satellites orbit in exosphere are used to transmit weather information and tv programs





Exercises

Q. (1): Mention the importance of the following device:

1. Van Allen Belts.
2. Altimeter.
3. Satellites.

Q. (2): What's meant by:

1. Atmospheric pressure.
2. The Aurora phenomenon.
3. Exosphere.

Lesson 2

Erosion of ozone layer and global warming

Position of ozone layer

Located at height 20:40Km

Structure ***of ozone layer:***

Consists of three oxygen atoms.

Formation of ozone gas:

1- Oxygen gas molecule absorbs u.v which causes the break down of the bond between the two oxygen atoms giving two free oxygen atom (2O)

$O_2 \longrightarrow O+O$

2- Each oxygen atom combines with an oxygen molecules forming ozone molecule (O_3)

$O+O \longrightarrow O_3$

Thickness of ozone layer:

20Km measuring unit is Dobson

Note:

At S T P (standard temperature and pressure) The English scientist Dobson postulated tht the thickness of ozone layer is 3mm only at normal pressure and 0 C

He assumed that the natural amount of ozone = 300 Dobson units.

Types of UV rays:

UV rays	Near UV	medium UV	Far UV
wavelength	315:400 nm	280:315nm	100:280nm
Range of penetration from ozone layer.	penetrate 100%	don't penetrate 95%	don't penetrate 100%

Harms of far and medium UV rays:

living organisms	**harmful effects**
human:	Increasing the rate of skin cancer. cataract. weakness of the immunity system.
amphibians:	Spoil eggs. decreasing the rate of reproduction.
Marine	death of plankton. destroying the marine food chains.
Terrestrial plants:	Upset the photosynthesis process. shortage of crops.

Erosion of ozone layer:

Scientists have noticed that there was erosion of ozone layer above the south poles .this phenomenon is known as an ozone hole that increase in September.

Bec all pollutants are pushed by wind toward south poles.

Ozone holes:

It means thinning layer above the south poles.

Pollutants of ozone layer:

1-chorofluorocarbon compound(CFC_s)(Freon)
-A cooling substance in air conditioning sets.
- A propellant substance in aerosols.
-A flatting substance in making foam backing.
-A Solvent substance for cleaning electric circuits.

2-Methyl bromide gas:
it is used as an insecticide.

3-Halons:
they are used in extinguishing fires.

4-Nitrogen oxides:
They are produce from the burning of fuel of ultrasound airplanes.(concorde)

The effect of chlorofluorocarbon:

Steps of erosion ozone Layer	chemical equations
First steps: UV breakdown the chlorofluorocarbon compound and liberate active chlorine atom(Cl)	$CFCl_3 \rightarrow CFCl_2 + Cl$
second steps: Active chlorine atom (Cl) react with ozone molecules (O3) forming chlorine monoxide (ClO)	$Cl + O_3 \rightarrow O_2 + ClO$ $ClO + O_3 \rightarrow 2O_2 + Cl$
Third steps: Chlorine monoxide (ClO)react with other ozone molecule, where other active chlorine atoms liberate and play their role in destroying more amount of ozone gas.	

Protecting the ozone layer:

Montreal protocol:(to protect ozone layer)

Some of these recommendations are:

- The use of CFCs must be reduced and find safer alternatives.
- Stop producing the ultrasound Concorde planes as their exhausts affect the ozone layer.

Global warming phenomenon:

It is the continuous increase in the average temperature of the's near-surface air.

The most important greenhouse gases:

1-carbon dioxide gas.

2-CFCs

3-Methane gas(CH_4).

4-Nitrous oxide (N_2O).

5-Water vapour (H_2O).

The reason for increasing greenhousegases ratio in the atmosphere:

1-Fossil fuel burning.

2-Cutting trees.

3-Forests fires.

Interpretation of the greenhouse phenomenon:

1-It permits the visible light and short-waved rays produced from the sun to pass.

2-the earth and it components absorb these rays and reemit the radiation back in form of infrared radiation.

3-The infrared radiation cannot penetrate the atmosphere because it has a long wavelength so it is kept trapped in the troposphere causing the rise in planet earth ‘ temperature.

Greenhouse effect:

It is the trapping of infrared radiation in the troposphere layer due to the increase in the ratio of greenhouse gases which cause the increase in temperature.

The ultraviolet radiation has a chemical effect, while infrared radiation has a thermal effect.

The negative effects of global warming phenomenon:

*Melting the ice and snow of both south and north poles:

1-coastal areas as they could drown.

2-extinction of some polar animals like the polar bear and seals.

*severe climate changes:

1-tropical hurricanes such as hurricane Katrina in 2005.

2 –destructive floods.

3-Drought waves.

4-Forest fires.

How to overcome global warming:

Kyoto protocol that suggests:

1-reducing the ratio of bad emission by cutting down consumption of fossil fuel .

2-searching for environmental friendly alternative energy resources.

Exercises

Q. (1):choose :

1. Ozone layer is measured by a unit called ………………………… .
   (Km - Dobson - nm - mm^3)
2. All are greenhouse gases except ………………………… .
   (CO_2 - O_2 - N_2O - CH_4)
3. The ozone molecule is consist of ……………………… .
   (4 oxygen atoms – 2 oxygen atoms – 3 o atoms – 1 oxygen atoms)
4. The CFCs compounds break down under the effect of ultraviolet rays to release................ at[illegible]n.
   (carbon - chloride - oxygen - Freon)

Q. (2): Give reasons:

1. The increasing in the ratio of CO_2 in the atmosphere.
2. Stop producing the Concord airplanes.
3. Formation of ozone layer in stratosphere.

Unit 3

Lesson 1 fossil

Fossil:

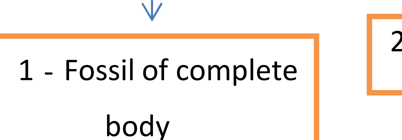
They are traces and remains of old living organisms that are preserved in sedimentary rock.

Trace : once of an old living indicate its activity during its life.ex:worm'tunnels

Remains: traces that indicate the remains of once an old living after death.ex: remains of adinosaur's skull.

Types of fossils:

Fossils are classified according to the way of formation into several types among them are:



1 - Fossil of complete body

2 - Cast

3 - Mold

4 - petrified fossils.

fossil of a complete body:

xample of a complete body fossil

A -Mammoth fossil:	B-amber fossil:
Types of elephant occurred in Siberia. t died and rapidly buried in snow it body didn't decompose.	Pine trees which secreted resinous matter that covers insects.

2 ▪ cast

a - Hollow cast: as the face mask which has the same external details of the face.

b - Solid cast :have the same internal details .

Solid cast: it is the replica of internal details of skeleton

Ex:ammonitesfossil,nummulites fossil trilobite fossil.

<u>3-mold:</u>

<u>A replica of the original external shell is formed</u>



<u>Examples of mold fossils:</u>

<u>Mold of ferns</u>

<u>Fish mold.</u>

<u>4-petrified fossils</u>:

They are fossils in which minerals replace the organic matter of organism part by part leaving the shape without any changes.

Examples of petrified fossils:

Dinosaur's tooth

Petrified wood are consider fossils although they look like rocks.

Bec.theygive us the detail about the life of once an old plant

Naming the petrified forest in qattamiya with wood mountain.

Bec. It contains petrified woods which look like rocks.

Petrification:

It is the process of replacing the wood material by silica to form petrified woods.

Suitable conditions for fossils formation

1-presence of hard skeleton.

2-the body must be buried immediately after death.

3-the existence of a suitable medium .

Importance of fossils:

1-age determination of sedimentary rocks:

Index fossils indicate the age of sedimentary rocks.

Because the age of rocks in the same age of fossils existed in them.

Index fossils:

They are fossils of organisms that had lived for short period of time and has wide geographic

2- **figuring out the paleoenvironment:**

Fossils give us an idea about the environment

Examples:

1-**Nummulites fossils:**they are found in limestone rocks of el-Mokattam mountain are they indicate this area was a sea floor more than 35 million years ago.

2-ferns fossils:

They indicate that the environment where they lived was a hot and rainy tropical environment.

3-Coral fossils:

They indicate that the environment where they lived was clear warm shallow seas.

3-Studing life evolution:

Fossil record:

Fossils exist in the rocks of different areas that indicate the extinction and evolution of organisms.

Gymnosperms → angiosperms

Fish → Amphibians → ReptilesBirds → and mammals

Archaeopteryx: link between reptiles and birds.

4-Petroleum exploration:

The suitable condition of petroleum formation:

If they contain micro fossils like foraminifera and radiolarian.

Q. (1): Arrange the following fossils according to their appearance on the life stage:

1. Mold fossil of fish.
2. Mammoth fossil.
3. Trilobite fossil.
4. Archaeopteryx.

Q. (2): What's the difference between:

1. Trace and mold.
2. Cast and mold.

Lesson 2

Extinction

It is the continuous decrease without compensation in the number of a certain species of living organisms .

The moment of extinction:

It is the date of death of individual of this species.

Factor causing extinction:

1-Cause of old extinction.

a- Meteorite impact with the earth.

b- The start of long ice age.

c- Emission of poisonous gases from active volcanoes.

2-cause of recent extinction.

a-destroying the natural habitat.

By overcutting of forest trees

b- over hunting

it causes extinction of thousands of reptiles and mammals.

c-environmental pollution.

Acidic rains fall which destroy the forest.

Chemical insecticides that break down food chain.

Oil leaks in oceans and seas cause the death of marine bird.

d- Climate changes and natural disasters.

1-the endangered species:

There are about 5000 endangered species:



panda bear: weak rate of reproduction.



Rhinoceros: overhunting for using the horns in some medical purpose.

bald eagle: feeding on fish contain poisonous matter



Ibis bird: loss of its nests after building the high dam

papyrus plant:drying of swamps where they grow.

2-The extinct species:

Dodo bird : easy target fo



small wings (can't fly)

short legs (can't run)

Quagga:



(between horse and zebra) continuous hunting

Ecosystem:

It is everything that is related to living thing existing somewhere (forest,desert,sea, ...)

Food chain:

Is the path of energy from living organism to another in the ecosystem.

kinds of ecosystem :

simple ecosystem	complicated ecosystem
it is an ecosystem that has a few members and it is severely affected by absence of one of its species. few members	it is an ecosystem that has multiple members and it is not affected much by the absence of one of its species. multiple members
desert ecosystem	tropical forest ecosystem.

Ways to protect the living organisms from extinction:

1- Issuing rules to control hunting.

2-Rearing and reproducing the endangered species. 3-

Increasing the awareness about importance of natural life.

4-Establishing gene banks for much endangered species.

5-Establising natural protectorate areas.

Natural protectorate: it is a safe area established to protect endangered species in their homeland.

natural protectorate	location	protected kinds
bluestone	U.S.A	grey bear
Panda	China	panda bear
Ras -Mohamed	Egypt	1-coral reefs 2-colored fish 3-rare plants 4-animals.

Note:

-Ras Mohamed protectorate:

- in Egypt, which contain 134 types of rare coral reefs and also contains colored fishes.
- It is the first one in Egypt which established in 1983.

Wadi Hetan:

It is part of Wadi El-Raiyan protractorate in Fayoum.

It contain about 205 complete whale skeleton fossils, from 406 whale skeleton fossils.

In 2005, the UNESCO declared Wadi Hetan as the best world heritage of whale skeletons.

Q. (1): Mention the most important factors that cause species extinction now.

Q. (2): Give reasons:

1. The desert ecosystem is affected severely by the absence of on specie.
3. The dodo bird is an easy target to hunt.
4. The ibis bird is considered as endangered species.

Q. (3): Mention one example of:

1. Endangered bird.
2. Animal habitats bamboo forest.
3. Extinct bird.